NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

CRITICAL AREA PLANTING

(Acre)

CODE 342

DEFINITION

Planting vegetation, such as trees, shrubs, grasses, or legumes, on highly erodible or critically eroding areas (does not include tree planting mainly for wood products).

PURPOSE

Stabilize the soil to reduce damage from sediment and runoff, improve wildlife habitat and visual resources.

CONDITIONS WHERE PRACTICE APPLIES

On highly erodible or critically eroding areas that cannot be stabilized by ordinary conservation treatment and management and if left untreated can cause severe erosion or sediment damage. Examples of applicable areas are dams, dikes, mine spoil, levees, cuts, fills, surface-mined areas, abandoned feedlots, and denuded or gullied areas where vegetation may be difficult to establish by normal planting methods. When establishing and maintaining vegetation on channel banks, berms, spoil and associated areas, refer to the Channel Vegetation standard.

CRITERIA

Plant species and their cultivars shall be selected based on:

- Climatic conditions, such as annual rainfall, seasonal rainfall patterns growing season length, temperature extremes, USDA Plant Hardiness Zones or Major Land Resource Areas.
- Soil condition and site position attributes such as soil texture, pH, available water holding capacity, slope, aspect, depth, or restrictive layers, inherent fertility, salinity and alkalinity, drainage class, flooding and ponding, and severe levels of toxic elements that may be present such as selenium and aluminum.
- Plant resistance to disease and insects common to the site or location.
- Plant compatibility with other forage species and their selected cultivar(s) in rate of establishment, maturity, palatability, and growth habit when seeded together as forage mix.
- Plant compatibility with irrigation if applicable.

Specified seed, methods of planting and date of planting shall be in accordance with Wyoming Plant Materials Technical Note #3. The planting rates for a Critical Area Planting will be double the rates listed in the Technical Note.

Site Preparation

Available soil should be identified, salvaged and stored by horizon prior to disturbance. Care needs to be taken that earth-moving equipment not uncover or redistribute on-site toxic materials. Toxic materials should be buried prior to site preparation.

To maintain biological attributes, topsoil should not be stored longer than two years. Sites that are unsuitable for vegetative establishment should be covered with a minimum of 4 inches of topsoil if possible. Topsoil should be spread evenly over the subsoil. If particle sizes are significantly different between subsoil and topsoil surface interfaces, mixing should occur to facilitate water percolation and root penetration. Sites reshaped with heavy

equipment may have a smooth hard surface and soil compaction making it difficult to prepare a good seedbed. Disking, ripping or other treatment may be necessary to prepare the site for seeding. During site preparation, all debris that could potentially interfere with the normal seeding operation should be removed.

Many critical area soils are low in most plant nutrients and should be tested for fertilizer recommendations. Fertilizer will be applied according to recommendations determined from a soil test. See the Nutrient Management standard in the Field Office Technical Guide. Caution should be used when recommending nitrogen application during establishment years, as the additional nitrogen may benefit more aggressive weed species. Phosphorus is often critical to stand establishment when legumes are being seeded.

When soils are course sandy, gravelly or granitic, or when water quality will be adversely affected, reduce fertilizer rates.

Follow up applications of fertilizer will be applied when needed and will be based on a soil test completed within the previous 5 years.

Prepare a firm, clean, weed-free seedbed prior to seeding. A seedbed is considered firm when the boot heel imprint of an average person leaves a maximum impression in the soil of no more than ½ inch. On sites where equipment cannot be operated, the seedbed will be prepared by hand. Broadcast seeding should be on freshly roughened soil surfaces.

The horizontal indentations left by tracked equipment may provide a suitable broadcast or drill planting site on steep slopes.

Species Selection

Seeding rates and species and variety selection will be chosen so as to allow for optimum vegetative establishment for the intended use. Planting dates, cultivars, and seeding rates for non-irrigated land are shown in Wyoming Plant Materials Technical Note #3. Conservation planners should reference material such as currently available Forage Suitability Groups or Ecological Site Descriptions, or *Dryland Pastures in Montana and Wyoming*, *Montana State University EB19, 9/2000* for species attributes and selection.

Where legumes are a stand component, the legume should be inoculated with the proper species of Rhizobia bacteria. See Wyoming Agronomy Technical Note #3.

All seed and planting materials shall be labeled and meet state seed quality law standards. The use of certified seed will be encouraged.

Based on germination and purity information found on the seed tag, adjust seeding rates at the field site to insure the required amount of pure live seed (PLS) is applied. See Wyoming Plant Materials Technical Note #6.

Seed will comply with the current Wyoming State seed laws and regulations. Refer to Section I, Laws, Field Office Technical Guide.

Plant densities of 3-10 plants per square foot for grasses and 1-5 plants per square foot for shrubs are desirable. However, judgement should be used when assessing stand adequacy on shallow, drought-prone sites, or sites where other limitations compromise stand establishment.

All seedings will be protected from grazing by domestic animals and other disturbances until stand establishment. Seeded species may be considered established when they are well rooted (not easily pulled out of the ground by hand) and/or are producing reproductive stems. A minimum of one full growing season is recommended. Establishment weed control will be by clipping or labeled herbicides.

Mulching

Straw is the preferred mulch but needs to be anchored in place with equipment such as rollers and crimpers. Tackifiers, woven netting, and other covers can be used to anchor mulch when slopes are too steep to use equipment on the site.

Wheat straw deteriorates less rapidly and results in less volunteer growth compared to barley straw. Use clean straw to minimize spread of noxious weeds.

Apply 10 lbs. of actual nitrogen per ton of straw to compensate for potential nitrogen immobilization during the mineralization process.

Woven, fabric, and artificial mulches can also be used.

A split hydromulch, hydroplanting operation is recommended on suitable sites. Seed and fertilizer should be applied first to optimize seed to soil contact, and then the mulch is hydromulched over the site.

When plantings are to be irrigated, use nonerosive methods to maintain adequate moisture in at least the upper six (6) inches of soil during the first four (4) weeks and then in the upper 12 inches until the end of the growing season. Seedlings may be susceptible to excessive irrigation during establishment.

See the Mulching Standard (484) in the Field Office Technical Guide for further information.

Herbaceous Planting

Drills will have agitators and other equipment needed to assure uniform seeding. Rice hulls and other dilutants will be used when determined necessary by the planner. Drilling will be on the contour or across slope where practical.

When broadcast seeding, a freshly roughened surface will accommodate seed catchment. The seed will be covered by use of hand raking or by dragging harrows, chains or other suitable equipment over the surface or mulched to cover the seed where practical.

Nurse crops will not be used.

Temporary cover crops can be used for up to two years where cover is needed. If construction is delayed on a site that has been disturbed, or will be re-disturbed in the near future, temporary cover crops can be used to protect the site against erosion or stabilize the site for eventual permanent vegetation establishment. In the latter situation, the cover crop must be clipped or chemically terminated prior to seed set to control volunteer competition to new seedlings. Refer to the Conservation Cover or Cover Crop standards.

Woody Planting

When considering bioengineering techniques for protecting critical areas, refer to Engineering Field Handbook, Chapter 18.

When establishing and maintaining vegetation on channel banks, berms, spoil and associated areas, follow the Channel Vegetation standard in the Field Office Technical Guide and Wyoming Plant Materials Technical Notes #2 and #8. The acceptable time period for obtaining woody cuttings from host plants and when woody cuttings will be planted is listed on the web site http://nativeplants.for.uidaho.edu/

Where woody plantings will be installed, the critical area will first be stabilized with herbaceous cover as noted in the previous section and broadleaf weeds controlled with labeled herbicides. Planting of woody species will be in accordance with Tree/Shrub Establishment in the Field Office Technical Guide. In most cases, trees and shrubs will be planted randomly rather than in a pattern following herbaceous plant establishment. This will allow the use of selective herbicides for broadleaf weed control during grass establishment. A map indicating planted areas should be developed to document the location of the plants for avoidance during routine maintenance operations.

Sodding

When using sod, the surface will be smoothed so air pockets will not form beneath the sod.

Sod strips will be fit closely together and tamped tightly in place. Sod will be staked down as needed to protect from movement on steep slopes.

Cut sod will be kept moist. The maximum time period between cutting and placement will not exceed 96 hours.

Areas covered with sod will be adequately irrigated until sod has become well established. Certain species may require permanent irrigation to maintain adequate cover.

Dryland sites that receive less than 18 inches of precipitation will not be sodded.

Dryland sites that receive greater than 18 inches of precipitation will be sodded early spring to May 1.

Irrigated sites will be sodded early spring to September 1.

Table 1 – Adapted Sod Species

Introduced Species	Native Species
Creeping Foxtail	Western Wheatgrass
Reed Canarygrass	Prairie Sandreed
Intermediate Wheatgrass	Slender Wheatgrass
Pubescent Wheatgrass	Streambank Wheatgrass
Kentucky Bluegrass	Thickspike Wheatgrass
Smooth Bromegrass	

Additional Criteria to Stabilize Critically Eroding Areas

Treatment of adjoining or upstream sites may be required prior to establishment of vegetation on critically eroding areas. Areas not suitable as a medium for plant growth should be covered with topsoil. When stabilizing areas prone to sheet and rill erosion or wind erosion, the amount of established vegetative cover needed to reduce erosion within the soil loss tolerance (T) or any other planned soil loss objective, shall be determined using currently approved erosion prediction technology. Calculations shall account for the effects of other practices in the conservation management system.

Additional Criteria to Revegetate Reclamation Areas

Areas such as gullies, mined lands or headcuts should first be stabilized utilizing other conservation practices. Water control practices will be installed as needed to control surface runoff and break up existing erosion patterns. Contour Buffer Strips or Riparian Forest Buffers should be considered where there is concern for water quality. See Wyoming Plant Materials Technical Notes #2 and #8 for establishment and rates.

The area will be shaped or graded to eliminate existing surface erosion patterns and improve ease of seeding operations.

CONSIDERATIONS

Consider the effects on erosion and the movement of sediment and soluble and sediment-attached substances carried by runoff.

Consider the short-term and construction-related effects on downstream watercourses.

Consider the filtering effect of vegetation on movement of sediment and dissolved and sediment-attached substance.

These sites are generally severely eroded or disturbed, have little topsoil, and have low fertility and few, if any, resident seeds. High seeding rates and a starter fertilizer are needed to insure adequate vegetative cover.

When seeding grasses, consider applying nitrogen fertilizer. Consider forms containing sulfur.

When seeding legumes, consider applying phosphorus fertilizer.

Consider the effective range of straw blowing equipment and hydro seeders when use is planned.

Consider using hydro planting and mulching on steep, inaccessible sites not suitable for straw mulch planting. Do not use when high winds or animal or foot traffic are expected to interfere.

When selecting species for planting, habitat needs of target wildlife species should be considered.

PLANS AND SPECIFICATIONS

Plans and specifications are to be prepared for each treatment area and include planting area preparation; species to be planted; methods and rates of planting; planting depth; time of planting; fertilizer requirements; irrigation requirements; and management or establishment requirements.

OPERATION AND MAINTENANCE

Maintenance needed for this practice includes:

1. Periodic inspection and evaluation of vegetation to determine maintenance needs.

2. Control of noxious weeds by appropriate recommended means.

3. Replanting due to drought, fire, insects or other events that prevented adequate stand establishment should be addressed within 1-3 years of planting. Recommendations may vary from complete re-establishment to overseeding or spot planting.

4. If Use Exclusion is not a planned component, than Prescribed Grazing and/or Forage Harvest Management (standards found in the Field Office Technical Guide) will be applied to an established planting.

Usage of the critical area should be avoided during periods of vegetative establishment, and usage thereafter should be minimal and based on the physiological condition of the vegetation. After establishment, the management of the area should comply with the Conservation Management System for the planned land use. (Section III, FOTG). The site may require permanent protection from both domestic livestock and wildlife. Refer to the Fence standard in the Field Office Technical Guide.

5. Repair of appurtenances and fences.

References

Montana Interagency Plant Materials Handbook. Montana State University Extension Service, EB 69, April 1993.

Selecting Species for Revegetation. Montana Agricultural Experiment Station, Montana State University, Bozeman, MT. Special Report 3. May 1984.

Plant Materials for Use on Surface-Mined Lands in Arid and Semiarid Regions. USDA-SCS. SCS-TP-157. January 1982.

Handbook of Western Reclamation Techniques. University of Wyoming, Office of Research. 1996

Native Plant Handbook. USDA-FS Northern Region, Missoula, MT. 1995.

USDA – NRCS Plant Materials available online http://Plant-Materials.nrcs.usda.gov/seeding.html